

a first refiner plate carried by the first refiner plate mounting surface, the first refiner plate comprised of a plurality of pairs of upraised refiner bars that define grooves therebetween that collectively form a first refining surface;

a second refiner plate carried by the second refiner plate mounting surface, the second refiner plate comprised of a plurality of pairs of upraised refiner bars that define grooves therebetween that collectively form a second refining surface, wherein the second refiner plate opposes and is spaced from the first refiner plate, and wherein a refining zone is defined between the opposed refining surfaces of the first and second refiner plates; and

wherein one of the refiner plates has one portion of its refining surface that is movable relative to another portion of its refining surface with the one portion of the refining surface and the another portion of the refining surface being angularly fixed during refining fiber.

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20. The rotary disk refiner of claim 16 wherein the one of the refiner plates has (a) a front with a front surface that comprises its refining surface and (b) a rear with a rear surface, and wherein the pocket in the one of the refiner plates extends completely through the one of the refiner plates, permitting insertion or removal of the insert from the rear of the one of the refiner plates.

21. The rotary disk refiner of claim 20 wherein the insert has a base with an outwardly extending portion, and adjacent the rear of the one of the refiner plates the pocket comprises an outwardly extending well that receives the outwardly extending portion of the base of the insert with the outwardly extending portion of the base of the insert preventing removal of the insert through the window.

22. The rotary disk refiner of claim 21 wherein the well comprises a counterbore or a countersink.

23. The rotary disk refiner of claim 22 wherein the outwardly extending portion of the base comprises a flange that extends outwardly about the periphery of insert and that engages the one of the refiner disks to prevent removal.

24. The rotary disk refiner of claim 1 wherein the one portion of the refining surface is comprised of an insert that is captured by the one of the refiner disks and the refiner plate mounting surface to which it is mounted.

25. The rotary disk refiner of claim 24 further comprising a biasing element between the insert and the refiner plate mounting surface to which the one of the refiner disks is mounted, wherein the biasing element urges the insert outwardly.

26. The rotary disk refiner of claim 24 further comprising a biasing element between the insert and the refiner plate mounting surface to which the one of the refiner disks is mounted, wherein the biasing element urges the insert outwardly such that the edges of the refiner bars of the insert are substantially flush with the edges of the refiner bars of the another portion of the refining surface.

49. A refiner disk segment for removably mounting to a refiner plate mounting surface of a rotary refiner comprising:

a first section that is axially displaceable relative to the refiner plate mounting surface;  
a second section that is axially displaceable relative to the refiner plate mounting surface and relative to the first section; and

wherein the first section is disposed radially outwardly of the second section.

51. The refiner disk segment of claim 49 wherein the first section extends annularly from one radial edge of the segment to the other radial edge of the segment and the second section extends annularly from the one radial edge of the segment to the other radial edge of the segment.

[Please add the following new claims:]

52. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising a base and a refining surface carried by the base that is comprised of a plurality of pairs of radially extending refiner bars that define a plurality of grooves therebetween with the refining surface comprised of a section having a plurality of refiner bars that is <sup>AYC</sup> angularly adjustable relative to a remainder of the refining surface with the angularly adjustable refining surface section being fixed during refining.

53. The refiner plate segment of claim 52 wherein the angularly adjustable refining surface section comprises an insert that is disposed in a pocket in the refining surface and wherein there is engagement between one of the insert and the base to prevent the insert from freeing itself from the base or the refining surface in an axially outward direction.

54. The refiner plate segment of claim 52 wherein the angularly adjustable refining surface section comprises an insert that is disposed in a pocket in the refining surface and that is axially displaceable relative to the remainder of the refining surface during refining.

55. The refiner plate segment of claim 52 wherein the angularly adjustable refining surface section comprises an insert that has a plurality of pairs of elongate refiner bars.

56. The refiner plate segment of claim 52 wherein the angularly adjustable refining surface section comprises an insert carried by the base that is angularly indexable.

57. The refiner plate segment of claim 52 further comprising a fastener that removably anchors the angularly adjustable refining surface section to the base.

58. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising:

a base having an outer peripheral edge;

a refining surface carried by the base that is comprised of a plurality of pairs of generally radially extending refiner bars upraised from the base that define a plurality of grooves therebetween;

a refining surface insert disposed radially inwardly of the outer peripheral edge of the base within a portion of the refining surface, the refining surface insert comprised of a plurality of pairs of upraised refiner bars defining a plurality of grooves therebetween with the insert being angularly rotatable for changing the angle of the refiner bars of the refining surface insert relative to the refiner bars of the refining surface to optimize performance.

59. The refiner plate segment of claim 58 wherein the refining surface insert is angularly adjustable between a plurality of pairs of positions such that the angle of the refiner bars of the refining surface insert changes relative to the refiner bars of the refining surface in tuning performance.

60. The refiner plate segment of claim 59 wherein the refining surface insert is angularly indexable between the plurality of pairs of positions.

61. The refiner plate segment of claim 58 wherein the refining surface insert is axially displaceable inwardly relative to the refining surface.

62. A refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the refiner plate comprised of a plurality of refiner disk segments that each have a refining surface comprised of a plurality of pairs of upraised refiner bars with a portion of the refining surface being angularly adjustable relative to a remainder of the refining surface with the angularly adjustable portion of the refining surface being angularly fixed during refining.

63. The refiner plate of claim 62 wherein the angularly adjustable portion of the refining surface is axially displaceable relative to the remainder of the refining surface during refining.

64. The refiner plate of claim 62 wherein the angularly adjustable portion of the refining surface is angularly adjustable between a plurality of pairs of positions such that the angle of the refiner bars of the angularly adjustable portion of the refining surface can be varied relative to the refiner bars of the remainder of the refining surface to tune performance.

65. A refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the refiner plate comprised of a plurality of refiner disk segments that each have a refining surface comprised of a plurality of pairs of upraised refiner bars with a portion of the refining surface being angularly adjustable relative to a remainder of the refining surface between a plurality of pairs of positions to tune refining performance by selecting the position that provides optimum performance.

66. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising:

a base having a refining surface comprised of a plurality of pairs of generally radially extending refiner bars upraised from the base that define a plurality of grooves therebetween and having a pocket in the refining surface;

an angularly adjustable and axially displaceable refining surface insert received in the pocket and engaging the base with the refining surface insert having a plurality of upraised refiner bars.

67. The refiner plate segment of claim 66 wherein the angularly adjustable and axially displaceable refining surface insert is angularly fixed during refining due to friction between the angularly adjustable and axially displaceable refining surface insert and the base.

68. The refiner plate segment of claim 67 further comprising a coil spring underlying the angularly adjustable and axially displaceable refining surface insert and urging the angularly adjustable and axially displaceable refining surface insert against the base.

at 69. The refiner plate segment of claim 66 wherein the pocket is defined by a sidewall, the insert is defined by a sidewall, one of the pocket sidewall and the insert sidewall comprises a plurality of detents and the other one of the pocket sidewall and the insert sidewall comprises a plurality of detent notches, and the plurality of detents are received in a plurality of the plurality of the detent notches to angularly fix the angularly adjustable and axially displaceable refining surface insert to keep it from angularly moving relative to the refining surface of the base.

70. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising:

a base having a refining surface comprised of a plurality of pairs of generally radially extending refiner bars upraised from the base that define a plurality of grooves therebetween and having a pocket in the refining surface;

an angularly adjustable and axially displaceable refining surface insert received in the pocket and engaging the base with the refining surface insert having a plurality of upraised refiner bars; and

a biasing element underlying the angularly adjustable and axially displaceable refining surface insert and urging the angularly adjustable and axially displaceable refining surface insert outwardly away from a refiner plate mounting surface of the rotary disk refiner.

71. The refiner plate segment of claim 70 wherein the biasing element comprises a coil spring disposed between the refiner plate mounting surface and the angularly adjustable and axially displaceable refining surface insert.

72. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising:

CH a base having a refining surface comprised of a plurality of pairs of generally radially extending refiner bars upraised from the base that define a plurality of grooves therebetween and having a pocket in the refining surface;

an angularly adjustable and axially displaceable refining surface insert received in the pocket and engaging the base with the refining surface insert having a plurality of upraised refiner bars that are angularly fixed during refining.

73. A segment of a refiner plate for a rotary disk refiner used to refine fibrous matter in a stock slurry, the segment comprising:

a base;

a refining surface that is axially displaceable during refining;

a plurality of spaced apart rotatable fasteners that removably engage the base to removably attach the axially displaceable refining surface; and

a biasing element urging the axially displaceable refining surface away from the base.

74. The refiner plate segment of claim 73 wherein the biasing element comprises a spring carried by each one of the plurality of fasteners wherein the spring is disposed between the axially displaceable refining surface and the base.

75. The refiner plate segment of claim 73 further comprising a plurality of refiner plate segment fasteners that removably attach the base to a refiner plate mounting surface of a rotary disk refiner.

76. The refiner plate segment of claim 73 wherein the base has a plurality of bores formed therein with each bore constructed and arranged to received one of the plurality of fasteners with one of the bore and fastener having a retainer channel with a J-shaped portion formed therein and the other one of the bore and the fastener having a pin extending therefrom that is received in the J-shaped portion of the retainer channel when removably attaching the axially displaceable refining surface to the base.

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